

**IN THE CLAIMS**

The following is a complete listing of the claims which replace any prior versions:

1           1-39. (Cancelled)

1           40. (New) A method for providing precise control of a magnetic coupling field in  
2        a NiMn top spin valve head, comprising:

3           forming a copper seed layer on a substrate;

4           forming a free layer on the copper seed layer;

5           forming a non-ferromagnetic layer on the free layer;

6           forming a copper spacer layer on the non-ferromagnetic layer;

7           forming a pinned ferromagnetic layer on the copper spacer layer; and

8           forming a NiMn pinning layer over the pinned ferromagnetic layer;

9           wherein the copper seed layer and copper spacer layer are oxidized separately during  
10      formation. .

1           41. (New) The method of claim 40, wherein the forming the copper seed layer  
2        comprises depositing a layer of copper as a seed layer and, before depositing a next layer,  
3        oxidizing the copper seed layer.

1           42. (New) The method of claim 41, wherein the forming the copper spacer layer  
2        comprises depositing a layer of copper as a spacer layer and, before depositing a next layer,  
3        oxidizing the copper spacer layer.

1       43. (New) The method of claim 40, wherein the forming the copper spacer layer  
2      comprises depositing a layer of copper as a spacer layer and, before depositing a next layer,  
3      oxidizing the copper spacer layer.

1       44. (New) The method of claim 40, wherein the copper seed layer and oxidized  
2      spacer layer are naturally oxidized for 80 seconds under  $8 \times 10^{-5}$  Torr of oxygen pressure.

1       45. (New) The method of claim 40, wherein the oxidized copper seed layer and  
2      oxidized spacer layer reduce the ferromagnetic coupling field without deteriorating GMR  
3      effect or resistance.

1       46. (New) The method of claim 40, wherein the oxidized copper seed layer and  
2      oxidized spacer layer provide a negative coupling field without affecting GMR effect or  
3      resistance.

1       47. (New) The method of claim 40, wherein the oxidized copper seed layer and  
2      oxidized spacer layer change the crystalline texture growth of subsequent layers.

1       48. (New) The method of claim 40, wherein the oxidized copper seed layer and  
2      oxidized spacer layer provide a negative coupling field that is achieved without affecting a  
3      GMR effect or resistance of the NiMn top spin valve head.

1       49. (New) The method of claim 48, wherein the oxidized copper seed layer and  
2      oxidized spacer layer provide stronger growth of NiFe(111) and NiMn(111) with respect to  
3      NiFe(200) and NiMn(002) phases.

1        50. (New) The method of claim 40, wherein the oxidized copper seed layer and  
2        oxidized spacer layer improve the interfacial roughness.

1        51. (New) The method of claim 40, wherein the oxidation of the copper seed  
2        layer and spacer layer does not affect asymmetry performance.